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09/751,649	12/29/2000	Ashok Singhal	M-8495 US	9244

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EXAMINER	
NGUYEN, STEVE N	
ART UNIT	**PAPER NUMBER**
2117	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	09/751,649	SINGHAL ET AL.	
	Examiner	Art Unit	
	STEVE NGUYEN	2117	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *17 December 2007*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-3 and 10-13* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-3 and 10-13* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *29 December 2000* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claims 1-3 and 10-13 are pending.

Claim Rejections - 35 USC § 112

The U.S.C. 112, first and second paragraph rejection of claims 1 and 12 has been withdrawn in view of the amended claims.

Response to Arguments

Applicant's arguments filed 12/17/2007 have been fully considered but they are not persuasive.

Applicant argues with respect to claim 1 that Steely does not disclose or suggest that an entire page at a node is mirrored to another node when less than the entire page is written.

The Examiner notes that Steely teaches a reflected memory write between nodes in col. 6, lines 46-47 and col. 7, lines 13-15. In a reflected memory write, written data is reflected to the other nodes. Steely discloses that connection granularity between nodes is at the page level (col. 4, lines 54-57), which means that the smallest unit of data transmitted between nodes is 8k bytes in the example in col. 4, lines 54-57. Therefore, data smaller than 8k bytes that is written to memory will still be transmitted in a page of 8k bytes by using pad bits or any other method commonly known in the art.

This makes sense because memories operate on units of data- in this particular case 8k bytes.

The Applicant argues with respect to claim 11 that the invention of claim 11 is simply not the storing of multiple blocks of data into a single memory device as suggested by the Examiner, but instead combines parity calculation and DMA transfer into a single operation.

The Examiner notes that Gunsaulus teaches a single operation of computing parity and writing the parity in the destination parity memory in col. 4, lines 29-33. Brought into the context of Steely and Ebrahim, it would have been obvious to one skilled to write the parity directly to the remote node since that is the destination node.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

1. Claims 1-3 10, 12, and 13 rejected under 35 U.S.C. 103(a) as being unpatentable over Steely, Jr. et al (US Pat. 6,049,889; hereafter referred to as Steely) in view of Grivna (US Pat. 5,850,556) in view of Ebrahim (US Pat. 5,887,134). Lawlor et al (US Pat. 6,038,677) is relied upon in claim 13 as a teaching reference to show that which was well known in the art.

As per claim 1:

Steely teaches a communication link protocol for communicating between a local node and a remote node of an interconnect system via a communication link, the communication link protocol comprising:

- a direct memory access (DMA) command for performing an inter-node transfer of a block of data directly from the local node to the remote node via one of the communication links (col. 4, lines 15-20);
- an administrative write command for writing data from the local node to registers in the remote node via the communication link for administrative purposes (col. 5, lines 36-45);
- a memory copy write command for copying an entire line of memory from a local node to a corresponding line of memory at the remote node via one of the communication links after a new data is written into the line of memory at the local node even when the new data is smaller than the line of memory at the local node (col. 6, lines 46-47; col. 7, lines 13-15; Steely teaches in col. 4, lines 54-57 that the memory address space is divided into N pages of data, where each page is 8 kilobytes of data. Therefore, it is clear that data must be

transmitted in pages of 8k bytes because Steely states that "connection granularity between nodes in the network is at the page level". When data smaller than 8k bytes is written into the memory address space, the entire 8k bytes of data must be transmitted because that is the page size as indicated by Steely).

Not explicitly disclosed by Steely is an inter-node DMA transfer of a block of data directly from a local node to a remote node. However, Ebrahim in an analogous art teaches memory mapped computer network nodes that employ DMA operations to transfer messages between nodes (col. 7, lines 21-30). Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to use DMA to transfer data in the system of Steely. This modification would have been obvious to one of ordinary skill in the art, at the time the invention was made, because one of ordinary skill in the art would have recognized that the page aligned DMA operation detailed by Ibrahim (col. 2, lines 46-48) could have been used in the page aligned memory structure of Steely (col. 4, lines 54-58) in order to free the CPU to perform other operations as stated by Ibrahim in col. 2, lines 52-53.

Also not explicitly disclosed by Steely is a built in self test (BIST) command for testing the functionality of the communication link. However, Grivna teaches a communication system which uses a BIST testing logic for testing the functionality of the communication link (col. 6, lines 52-56). Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to combine a BIST testing architecture as described by Grivna with the system of Steely to issue a BIST

command for testing the functionality of the communication link. This modification would have been obvious to one of ordinary skill in the art, at the time the invention was made, because one of ordinary skill in the art would have recognized that BIST would have provided the advantage of allowing diagnostics of the communication link, as described by Grivna in column 6, lines 52-56.

As per claim 2:

Steely further teaches the communication link protocol of Claim 1 wherein each command is conveyed between the local node and the remote node in the form of a respective command packet (col. 9, lines 8-9).

As per claim 3:

Steely further teaches the communication link protocol of Claim 2 wherein each respective command packet carries information for at least one command flag (col. 9, lines 18-23; the DV bits are a command flag that dictate the occurrence of an idle cycle).

As per claim 10:

Steely further teaches the communication link protocol of Claim 1, wherein said performing an inter-node DMA transfer of a block of data directly from the local node to the remote node comprises copying the block of data from a local memory of the local node to a remote memory of the remote node (col. 8, lines 41-43).

As per claim 12:

Steely further teaches the memory copy write command of claim 12 as detailed above in claim 1 in col. 4, lines 54-57 and col. 7, lines 13-15 in which existing data is

necessarily read, new data merged in a page, and then written and transferred in a reflected memory write to the remote location.

As per claim 13, the Examiner asserts that it was well known to identically replicate data of a local node at a remote node. For example, Lawlor et al (US Pat. 6,038,677) teaches that a cluster configuration is which each component is mirrored to ensure redundancy in the even that one node fails is well known in the art (col. 1, lines 14-27).

2. Claim 11 rejected under 35 U.S.C. 103(a) as being unpatentable over Steely in view of Grivna in view of Ibrahim as applied to claim 1 above, and further in view of Gunsaulus et al (US Pat. 5,914,970; hereinafter referred to as Gunsualus).

As per claim 11:

Steely, Grivna, and Ibrahim teach the communication link protocol of claim 1 above. Not explicitly disclosed is said writing a block of data from a local node to a remote node comprises computing parity over multiple blocks of data from a local memory of the local node and writing the parity to a remote memory of the remote node. However, Gunsaulus in an analogous art teaches computing parity for a number of memory devices and writing the parity in one dedicated memory device (col. 1, lines 46-52).

Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to compute parity over multiple blocks of data and write the parity to a remote memory of the remote node. This modification would have

been obvious to one of ordinary skill in the art, at the time the invention was made, because one of ordinary skill in the art would have recognized that using one memory device for parity storage reduces the number of memory devices needed for storing parity, as disclosed by Gunsaulus in col. 1, lines 52-55.

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to STEVE NGUYEN whose telephone number is (571)272-7214. The examiner can normally be reached on M-F, 10am-6:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jacques Louis-Jacques can be reached on (571) 272-6962. The fax phone

number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Steve Nguyen
Examiner
Art Unit 2117

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